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27 February 1959

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Attention: [Redacted]

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Subject: Progress Reports, Submission of

Enclosure: (A) Progress Reports for the Month of January 1959,
in quadruplicate

Gentlemen:

As required, Enclosure (A), described above, is submitted detailing the progress achieved during the month of January 1959.

In the event further information is desired concerning the enclosed reports, do not hesitate to contact the writer.

Very truly yours,

[Redacted] 25X1

[Redacted]
Contract Administrator
NKG:js

[Redacted] 25X1
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CC: [Redacted]

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605 T.O. 1

CONFIDENTIALPROGRESS REPORT
FOR
MONTH OF JANUARY 1959TRANSPORTABLE INFLATABLE ANTENNA

Purpose: The scope of this project is to design, develop and test one antenna system for the 350-10,000 mc range and to fabricate and deliver five complete antenna systems with indoor mounts and two interchangeable outdoor mounts.

Personnel: Electrical Engineers: 25X1

Mechanical Engineers: 25X1

Status: The E-plane and H-plane patterns of the 4 foot dish were taken as mentioned in last month's report. The side lobe level was a maximum of 12 db down at 600 mc. In general, the pattern characteristics of the dish were very good. The impedance of the logarithmically periodic primary feed was measured in conjunction with the dish. A test model of a tapered line balun was constructed for the primary feed and the input VSWR checked. It was found that the VSWR was below 4:1. Patterns were also taken on the primary feed alone to determine if this balun had any effect on the pattern characteristics of the feed; very minor effects were observed.

The radiation patterns of the feed horn for the 2 foot dish have been taken in free space. The VSWR was found to be better than 1.8:1 over the frequency range of 6000-10,000 mc.

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The mechanical work is proceeding on schedule. All of the major structural parts are now in the model shop, and all the major purchased parts are on order. The transmission line that is being furnished is of a new type (Andrew - 3/8 inch Heliac) and delivery of all that required will not be made for 6 weeks. However, one complete system will be delivered next week. Two of the inflatable bags will be delivered within two weeks. The remaining work consists of detailing the feed supports, final feeds, and coax clamps.

Work on the instruction book will begin next week.

Future Plans: The radiation patterns on the 2 foot dish will be taken.

Further work will be done on trying to improve the match of the periodic feed. A final model of the periodic feed will be constructed and tested in free space and in conjunction with the inflatable dish as soon as possible.

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TRANSPORTABLE INFLATABLE ANTENNA

Purpose: The scope of this project is to design, develop and test one antenna system for the 350 - 10,000 mc range and to fabricate and deliver five complete antenna systems with indoor mounts and two interchangeable outdoor mounts.

Personnel: Electrical Engineer:
Mechanical Engineers:

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Status: With reference to last month's report a logarithmically periodic structure having the following parameters was constructed:
 $\alpha = 60^\circ$, $\gamma = .707$, $\beta = 10^\circ$, $\psi = 45^\circ$ and with the longest element being 26 cm. in length. The low frequency limit of this structure is about 600 mc and it was tested in conjunction with a four foot dish. The data taken on this primary feed and dish can be scaled to the low frequency requirement of this project.

Impedance was measured and patterns were taken on this particular structure in free space.

The structure was placed in front of the four foot dish and data was taken for curves of relative gain versus the spacing between the structure and the surface of the dish as described in a previous report. From these curves a compromise location of the feed was found and at the present time patterns are being taken on the dish antenna to confirm that the choice of location of the feed with respect to the dish was a good one as far as side lobes are concerned.

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During the above measurements, the absolute gain of the dish was measured at 6000 and 950 mc. It was found that the gain at 6000 and 950 mc respectively was about 34.5 and 19.3 db. This demonstrates very good agreement with theoretical gain figures which are 35.5 and 19.5 db respectively.

The design of the supporting structure for the 6.5 ft. dish is nearing completion, and the majority of the drawings for the engineering model have been finished. Orders have been placed in the model shop for some of the parts; the rest of the parts will be ordered within a week.

The ring to support the inflatable bag has been redesigned. The new design will permit the use of a one-piece or two-piece type bag.

The design of the support for the 2 foot dish has been pretty well decided upon and will be designed soon. Also the two foot dish will be purchased soon.

Future Plans: The impedance of the logarithmically periodic primary feed will be measured in conjunction with the dish and any necessary impedance matching by means of a tapered line will be worked out. The horn feed for the two foot dish will be tested alone and in conjunction with the dish as soon as the horn and the dishes have been received. The support for the two foot dish will be completed as soon as possible as well as the feed support for both dishes.

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TRANSPORTABLE INFLATABLE ANTENNA

Purpose: The scope of this project is to design, develop, and test one antenna system for the 350-10,000 mc range and to fabricate and deliver five complete antenna systems with indoor mounts and two interchangeable outdoor mounts.

Personnel: Electrical Engineer: Mechanical Engineer:

Status: The phase center of the logarithmically periodic primary feed antenna mentioned in last month's report was located for various values of ψ angle (15 to 120 degrees in 15 degree steps) at a single frequency. It was observed that the phase center appeared very near the apex of the structure when the ψ angle was about 120 degrees. This is unfortunate because the front to back ratio of a structure with a ψ angle of 120 degrees is very poor; such a structure could not be used as a primary feed. Therefore, it will be necessary to investigate the effect on the pattern characteristics of the dish as a function of a deviation of phase center of the primary feed from the focal point of the dish.

Future Plans: The literature will be checked to determine what has been learned in previous investigations as to the effect on the pattern characteristics of a parabolic reflector when the phase center of the primary feed does not coincide with the focal point of the reflector. A setup for recording the patterns of a dish with its primary feed will be made. Work will be done on the design of the inflatable dish and its mount during the next month.

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